

Serial No.: 10/796,704

Examiner: Delma R. Flores Ruiz

Title: SEMICONDUCTOR LASER DEVICE AND OPTICAL PICK UP APPARATUS USING THE SAME

Page 5 of 8

REMARKS

Reconsideration is requested in view of the above amendments and the following remarks. Applicant appreciates the courtesy shown by the Examiner in discussing this application with the Applicant's representative Christine Yang on November 13, 2007. The above amendments and the following remarks reflect the substance of the interview. Claim 16 has been editorially revised. No new matter has been added. Claims 16-28 remain pending in the application.

Claim Rejections – 35 USC § 102

Claims 16-23 are rejected under 35 USC § 102(b) as being anticipated by Shimoyama et al. (JP 2000-312052). Applicant respectfully traverses this rejection.

Claim 16 is directed to a semiconductor laser device having a ridge including a first region where a width of a bottom portion of the ridge is constant along an optical path direction, and a second region where the width of the bottom portion of the ridge is varied continuously in the optical path direction. "Continuously" means in a manner having an uninterrupted extension in sequence. See WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY at 493-94 (G. & C. Merriam Company, 1976). The "width of a bottom portion of a ridge is varied continuously" means the width of the bottom portion of the ridge at any cross section is different from a width of the bottom portion of the ridge for the other cross sections in the second region.

Claim 16 further requires a length of the first region to be 10% to 50% with respect to a resonator length. This configuration helps suppress a differential resistance (R_s) of current-voltage characteristics of the semiconductor laser device and, as a result, an operation voltage can be decreased. The decrease in the operation voltage permits a lower operation power, which improves the temperature characteristics and reliability of the semiconductor laser device consequently. Moreover, since the length of the first region is at most 50% of the resonator length, the second region can be sufficiently long. As a result, the tilt angle in the second region as shown in Fig. 2 can be reduced, and thus the waveguide loss decreases (see generally page 7, line 36 to page 10, line 31 of the present specification).

Serial No.: 10/796,704
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Title: SEMICONDUCTOR LASER DEVICE AND OPTICAL PICK UP APPARATUS USING THE SAME
Page 6 of 8

Shimoyama et al. fail to disclose or even suggest a length of the first region to be 10% to 50% with respect to a resonator length, as required by claim 16. Instead, Shimoyama et al. discuss a central region (marked as "first region" in the Examiner revised drawing at page 3 of the Office action) and an outer region (marked as "second region" in the Examiner revised drawing at page 3 of the Office action) between the central region and an end face in an optical path. In Shimoyama et al., the discussion of the width of the ridge is provided in two examples in paragraphs [0055] and [0063] respectively. Paragraph [0055] discusses a central region having a length of 400 μ m and an outer region having a length of 50 μ m, where the outer region includes a tilted portion of 30 μ m and a constant portion of 20 μ m (see Shimoyama et al., paragraphs [0055] and Fig. 3(a)). Paragraph [0063] discusses a central region having a length of 300 μ m and an outer region having a length of 50 μ m, where the outer region includes a tilted portion of 30 μ m and a constant portion of 20 μ m (see Shimoyama et al., paragraphs [0063] and Fig. 3(a)). In either case, the central region is 75% or more of the resonator length, completely different from the length of the first region being 10% to 50% with respect to a resonator length as required by claim 16. Consequently, in Shimoyama et al., a differential resistance (R_s) of current-voltage characteristics of the semiconductor laser device is increased and an operation voltage is increased. The increase in the operation voltage requires a higher operation power. As a result, the amount of heat generated in the semiconductor laser device increases and thereby causes the problem of a reliability degradation of the semiconductor laser device.

Moreover, since the length of Shimoyama et al. central region is at least 75% of the resonator length, the length of the Shimoyama et al. outer region cannot be sufficiently long. As a result, the tilt angle of the outer region has to be relatively larger, and therefore a waveguide loss increases. Because of this, Shimoyama et al. do not disclose or even suggest a length of the first region being 10% to 50% with respect to a resonator length, as required by claim 16.

The rejection contends that paragraphs [0058]-[0059] of Shimoyama et al. disclose that a length of a first region is 10% to 50% with respect to a resonator length, as required by claim 16. Applicant respectfully contends that paragraphs [0058]-[0059]

Serial No.: 10/796,704

Examiner: Delma R. Flores Ruiz

Title: SEMICONDUCTOR LASER DEVICE AND OPTICAL PICK UP APPARATUS USING THE SAME

Page 7 of 8

merely discuss that the resonator structure is subjected to asymmetrical coating of front face 10%-end face 90%, and thereafter, is separated into chips by secondary cleavage. Paragraphs [0058]-[0059] in fact fail to disclose or even suggest that a length of the first region is 10%-50% with respect to a resonator length as required by claim 16. A verified translation of paragraphs [0058]-[0059] in Shimoyama et al. is attached herewith.

For at least these reasons, claim 16 is patentable over Shimoyama et al. Claims 17-23 depend from claim 16 and are patentable along with claim 16 and need not be separately distinguished at this time. Applicant is not conceding the relevance of the rejection to the remaining features of the rejected claims.

Claim Rejections – 35 USC § 103

Claims 24-28 are rejected under 35 USC § 103(a) as being unpatentable over Shimoyama et al. in view of Doi et al. (US 5,679,947). Applicant respectfully traverses this rejection.

Claims 24 is patentable over Shimoyama et al. for reasons similar to those discussed above. Claim 24 is directed to an optical pickup apparatus that has a semiconductor laser device having a ridge including a first region where a width of a bottom portion of the ridge is constant along an optical path direction, and a second region where the width of the bottom portion of the ridge is varied continuously in the optical path direction. Claim 24 also requires the second region to be placed between the first region and an end face in an optical path. Claim 24 further requires a length of the first region to be 10% to 50% with respect to a resonator length. Shimoyama et al. fail to disclose or suggest such an arrangement as recited in claim 24. For at least these reasons, claim 24 is patentable over Shimoyama et al. Doi et al. do not remedy the deficiencies of Shimoyama et al. Claims 25-28 depend from claim 24 and are patentable along with claim 24 and need not be separately distinguished at this time. Applicant is not conceding the relevance of the rejection to the remaining features of the rejected claims.

Serial No.: 10/796,704

Examiner: Delma R. Flores Rulz

Title: SEMICONDUCTOR LASER DEVICE AND OPTICAL PICK UP APPARATUS USING THE SAME

Page 8 of 8

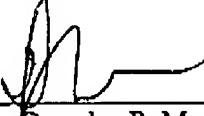
In view of the above, favorable reconsideration in the form of a notice of allowance is respectfully requested. Any questions regarding this communication can be directed to the undersigned attorney, Douglas P. Mueller, Reg. No. 30,300, at (612) 455-3804.

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PATENT TRADEMARK OFFICE

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Dated: December 19, 2007

DPM/cy